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FACSIMILE COVER SHEET

TO: Examiner: **DAVID E. GRAYBILL** – ART UNIT: **2827** - U.S. Patent and Trademark Office

CLIENT NAME/NUMBER: 51539

TELEPHONE: 703-308-2947 **FAX NO:** 703-872-9306

FROM: Paul J. Ditmyer, Esq. **DATE:** October 12, 2004

NUMBER OF PAGES (INCLUDING COVER SHEET): 26

COMMENTS/INSTRUCTIONS:

Please see attached Appeal Brief for U.S. Patent Application Serial No. 09/931,587.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF APPEALS

In re Patent Application of: SALATINO ET AL.	
Serial No. 09/931,587	
Filing Date: AUGUST 16, 2001	Examiner: D. GRAYBILL
For: METHOD AND APPARATUS FOR MAKING INTEGRATED CIRCUIT PACKAGE INCLUDING OPENING EXPOSING PORTION OF THE IC	Art Unit: 2827

APPELLANTS' APPEAL BRIEF

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith is Appellants' Appeal Brief (in triplicate) together with the requisite $340.00 fee for filing a brief. If any additional extension and/or fee is required, authorization is given to charge Deposit Account No. 01-0484.

(1) REAL PARTY IN INTEREST

The real party in interest for the present application is the assignee, Authentec, Inc.

(2) RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences for the present application.

(3) STATUS OF CLAIMS

Claims 1-22 and 24-33 are pending in the present application, with Claims 1-11, 13-22 and 24-33 being drawn to

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the elected invention, Claim 12 being withdrawn and Claims 34-62 being canceled. All of Claims 1-11, 13-22 and 24-33 are rejected and are the subject of this appeal.

(4) STATUS OF AMENDMENTS

No amendment was filed after the final rejection. Accordingly, the claims in the Appendix incorporate any previous Amendments.

(5) SUMMARY OF CLAIMED SUBJECT MATTER

Independent method Claim 1 is directed to a method for making an integrated circuit (IC) package with an exposed portion of the IC. Referring to FIGs. 4-6 (reproduced below) and page 10, line 19 through page 13, line 12 of the specification, the claim recites that the method includes providing a mold including first and second mold portions 47, 48, with the first mold portion carrying a mold protrusion 70 defining an IC-contact surface 71 with peripheral edges and a bleed-through retention channel 72 positioned inwardly from the peripheral edges. The method further includes closing the first and second mold portions 47, 48 around the IC 32 and injecting encapsulating material 33 into the mold to form the IC package with the exposed portion adjacent the mold protrusion 70 and while the bleed-through retention channel 72 retains encapsulating material 39 bleeding beneath the peripheral edges of the IC contact surface 71.

It has been found that a flat contact surface of a mold protrusion alone is not likely to reliably prevent the encapsulating material 33 from wicking along the interface

between the contact surface 71 and the IC 32. It is also likely that typical mold clamping pressures cannot be exerted on the IC 32 without considerable risk of damage. Because the clamping pressure is typically lowered, the potential for bleed-through or wicking of the encapsulating material becomes more important. Accordingly, the bleed-through retention channel 72 may be considered as providing a moat to act as a natural break for the bleeding of the encapsulating material 33 during molding. Method Claim 1 also recites releasing the IC package from the mold. Claims 2-11 and 13-21 depend from independent Claim 1 and stand together therewith.

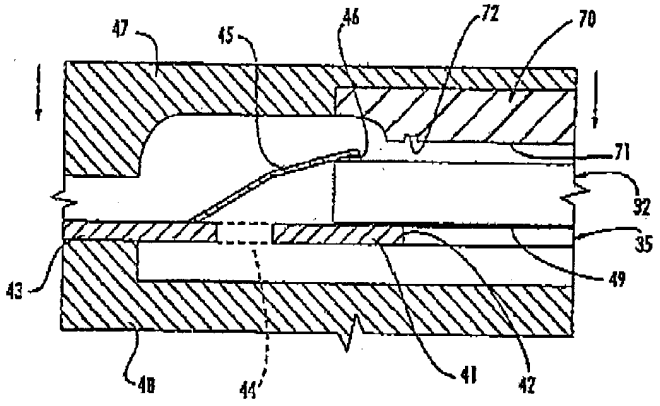

FIG. 4.

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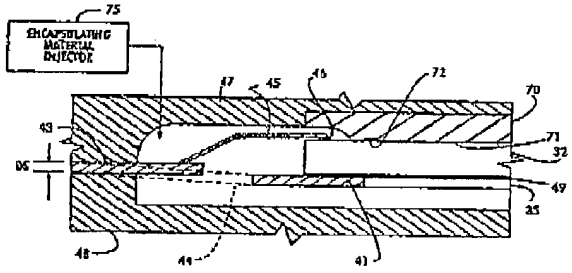

FIG. 5.

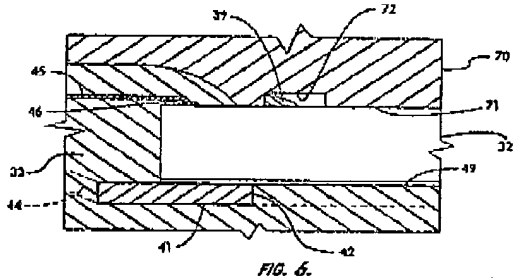

FIG. 6.

Independent method Claim 22 is also directed to a method for making an IC package with an exposed portion of the IC. This claim, however, is directed to a different aspect than Claim 1, that is, referring also to FIGs. 4-6 and to page 9, line 21 through page 12, line 21 of the specification, this claim recites mounting the IC **32** on a leadframe **35** having resilient portions **44** to resiliently accommodate downsetting of the IC within the mold as the IC-contact surface **71** contacts the IC. Independent Claim 22 further recites closing the first and second mold portions around the IC and leadframe to downset the IC under controlled pressure applied by the IC-contact surface to the IC and while the second mold portion

has a surface opposite the IC and that remains spaced therefrom. The claim further recites injecting encapsulating material 33 into the mold and releasing the IC package from the mold.

In other words, the resilient die pad support bars 44 permit the IC 32 to be contacted and moved downwardly to the position as shown in FIG. 5 so that the die pad 41 is displaced below the finger portions 43. Accordingly, a close fit is provided between the IC 32 and contact surface 71 to prevent encapsulating material from bleeding extensively beneath the mold protrusion 70 and onto the surface of the IC 32, and without crushing the IC.

The downsetting also accommodates skew of the IC surface and variations in thickness of the IC 32, adhesive layer 49, and/or portions of the leadframe 35. Considered in somewhat different terms, the manufacturing method includes controlling pressure applied by the IC-contact surface 71 to the IC 32 when the first and second mold portions 47, 48 are closed around the IC. This may be done as shown in the illustrated embodiment by mounting the IC 32 on the leadframe 35 having resilient portions to resiliently accommodate downsetting of the IC as the IC-contact surface 71 contacts the IC. The resilient die pad support bars 44 as shown in the illustrated embodiment, for example, maintain a desired pressure placed on the IC 32 by the contact surface 71 of the mold protrusion 70 when the mold is closed. The die pad support bars 44 are placed in tension by the downsetting to provide a spring-like force or pressure to IC 32 against the

contact surface 71 of the mold protrusion 70. This pressure is controlled to avoid risk of damage while reducing likelihood of bleed-through of the encapsulating material 33 beneath the contact surface 71 as will be appreciated by those skilled in the art. Considered yet in other terms, the die pad 41 is essentially allowed to float during the molding process. The die pad support bars 44 can readily accommodate tolerance variations of several thousandths of an inch and produce high quality IC packages. Claims 23-33 depend from independent Claim 22 and stand together therewith.

(6) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-11 and 13-33 stand rejected under 35 U.S.C. §102(b) and/or §103(a) as being unpatentable over U.S. Patent No. 5,177,669 to Juskey et al. or Japanese Patent Publication No. JP4-354341 to Kamiyama taken individually or in various combinations with Appellants admitted prior art, U.S. Patent No. 6,143,588 to Glenn, U.S. Patent No. 5,789,806 to Chua et al., U.S. Patent No. 5,712,507 to Eguchi et al., and/or U.S. Patent No. 5,703,398 to Sono et al.

More specifically, with respect to the independent claims, independent Claim 1 stands rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,177,669 to Juskey et al. taken in combination with U.S. Patent No. 5,703,398 to Sono et al.; and independent Claim 22 stands rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,177,669 to Juskey et al., and as being anticipated by Japanese Patent Publication No. JP4-354341 to Kamiyama.

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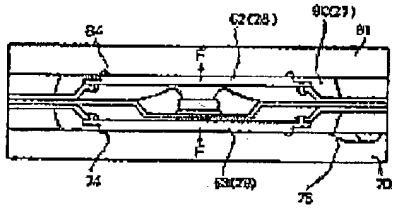
(7) **ARGUMENT**

A. Independent Claim 1 and Its Dependent Claims are Patentable

The Examiner rejected independent Claim 1 under 35 U.S.C. §103 as being obvious over the combination of Juskey et al. and Sono et al. The Examiner correctly recognized that Juskey et al. fails to discloses a bleed-through retention channel positioned inwardly from the peripheral edges of the mold protrusion as in the claimed invention. The Examiner cites Sono et al. as teaching a bleed-through retention channel.

Firstly, Appellants maintain that the Examiner has misinterpreted the cited references. Specifically, Appellants note that Sono et al. discloses grooves **74**, **84** in the flat top and flat bottom mold portions of a mold to engage top and bottom heat radiating elements **62**, **63** of an IC device (see FIG. 22 of Sono et al. reproduced below). Indeed, there is no IC-contact surface at all, much less an IC-contact surface with a bleed-through retention channel as claimed.

FIG. 22



Accordingly, the selective combination by the Examiner still fails to result in the invention as claimed. It

is also noted that the present invention is concerned with the difficulties in keeping encapsulating material from bleeding under a mold protrusion that contacts the IC to form an opening therein. The Sono et al. reference is not directed to nor concerned with IC's having an opening therein.

Secondly, Appellants respectfully submit that such a selective combination of prior art references goes clearly against the teachings of the primary reference, Juskey et al. For example, Juskey et al. discloses:

> "During the molding operation, the elastomeric member 48 presses or bears against the active surface 15 of the die in order to prevent flashing of the molding compound across the die surface." (Col. 3, lines 35-39). (Emphasis added).
>
> "The arrangement of the mold further provides that the second face 20 and the first face 14 of the die are both free of plastic molding material 50 and are revealed or exposed to the environment." (Col. 3, lines 63-67). (Emphasis added).
>
> "The instant invention eliminates the molding material from the surface of the active circuitry of the die and the back side of the die, thereby reducing the amount of molding material used and also reducing the attendant cost of the package." (Col. 4, lines 4-8). (Emphasis added).

Accordingly, it is submitted that there is no proper motivation in the prior art to selectively combine pieces of Juskey et al. and Sono et al. to produce the claimed invention. This is highlighted by the clear teaching away

from the claimed invention by the primary reference, Juskey et al.

Thus, Appellants maintain that the Examiner is impermissibly using the teachings of Appellants' own patent application as a roadmap to modify the prior art. For example, as noted above, the Juskey reference emphasizes keeping the faces of the IC free of molding material, contrary to the present invention; and the Sono et al. reference is not even concerned with IC's having an opening therein.

As the Examiner and BPAI are aware, to establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. Second, there must be a reasonable expectation of success. Finally, the prior art reference must teach or suggest all the claim features. The initial burden is on the Examiner to provide some suggestion of the desirability of doing what the Applicants have done. To support the conclusion that the claimed invention is directed to obvious subject matter, either the reference must expressly or impliedly suggest the claimed invention or the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the reference. Both the suggestion to make the claimed combination and the reasonable expectation of success must be founded in the prior art and not in Appellants' disclosure.

There is simply no teaching or suggestion in the

cited references to provide the combination of features as claimed. Accordingly, for at least the reasons given above, Appellants maintain that the cited references do not disclose or fairly suggest the invention as set forth in Claim 1. Furthermore, no proper modification of the teachings of these references could result in the invention as claimed. Thus, the decision by the Examiner to reject Claim 1 under 35 U.S.C. §103(a) should be reversed.

Independent method Claim 1 is thus patentable and it is submitted that its dependent claims, which recite yet further distinguishing features, are also patentable over the cited references for at least the reasons set forth above. Accordingly, these dependent claims require no further discussion herein.

B. Independent Claim 22 and Its Dependent Claims Are Patentable

Independent method Claim 22 was rejected as anticipated by Juskey et al., and was also rejected as being anticipated by Kamiyama et al.

The Examiner contends that since the bottom mold protrusion 43 of Juskey et al. could be an elastomeric material in some embodiments, that the leadframe 30 of Juskey et al. inherently includes resilient portions and inherently resiliently accommodates downsetting of the IC upon closing the top and bottom mold portions. Appellants respectfully disagree with the Examiner's stretch to assert inherency. There is simply no disclosure in Juskey et al. of such downsetting as claimed, and the inherency argument appears to

require a teaching that the bottom mold protrusion was less compliant than the upper mold protrusion.

Appellants point out that MPEP §2112 sets forth that the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. In relying upon the theory of inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art.

With respect to Juskey et al. reference, the Examiner has not provided a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the reference.

Moreover, even if the Examiner's inherency argument were correct, amended independent Claim 22 is still patentable. Amended independent Claim 22 recites that the IC is mounted on a leadframe having resilient portions to resiliently accommodate downsetting of the IC within the mold as the IC-contact surface contacts the IC. Moreover, Claim 22 also recites closing the first and second mold portions around the IC and leadframe to downset the IC under controlled pressure applied by the IC-contact surface to the IC and while the second mold portion has a surface opposite the IC that remains spaced therefrom.

A careful reading of column 3, lines 14-42 of the Juskey patent, referring to FIG. 4 (reproduced below), reveals that "a bottom half 40 of a mold has a pedestal or first

member 42 upon which the die 12 rests." In other words, in Jsukey, the "surface opposite the IC" contacts the IC and does not remain spaced therefrom as claimed.

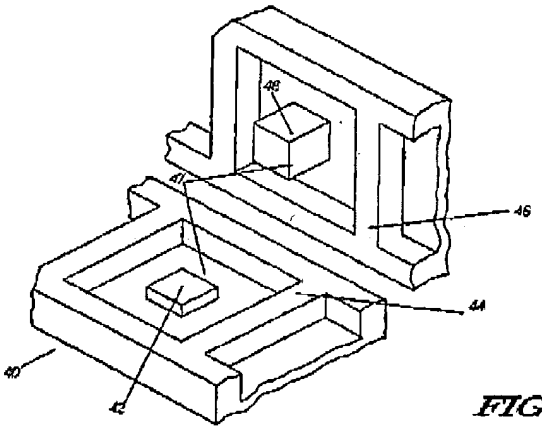


FIG.4

Furthermore, "the elastomeric member 48 presses or bears against the active surface 15 of the die in order to prevent flashing of the molding compound across the die surface. The first member 42 in the bottom half of the mold may also be an elastomeric material so as to create a tight seal and more compliance around the die 12." Juskey goes to great lengths to explain how the IC is pressed between the two members but never discusses or suggests the possibility that the leadframe should have resilient portions to resiliently accommodate downsetting of the IC within the mold as the IC-contact surface contacts the IC.

Juskey et al. fails to teach or suggest such resilient leadframe portions, and also fails to teach or suggest the second mold having a surface which remains spaced from the IC during downsetting.

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Turning now to the Kamiyama reference, Appellants point out that such reference is indeed directed to resin molding of an IC chip. However, the method and system of Kamiyama et al. include a mold having a protrusion with holes to create a vacuum and suck the IC chip to the protrusion. The method does not include the step of "closing the first and second mold portions around the IC and leadframe to downset the IC..." as claimed. Indeed, as can be clearly seen in FIGs. 3(a) and 3(b) of Kamiyama et al., the mold is already closed before the IC chip 32 is sucked to the protrusion 22.

As the Examiner and BPAI are aware, a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. The identical invention must be shown in as complete detail as is contained in the claim.

There is simply no teaching or suggestion in the cited references to Juskey et al. or Kamiyama et al. to provide the combination of features as claimed. Accordingly, for at least the reasons given above, Appellants maintain that the cited references do not disclose or fairly suggest the invention as set forth in Claim 22. Thus, the Examiner's decision to reject Claim 22 under 35 U.S.C. 102(b) over Juskey et al. and Kamiyama et al. should be reversed.

Independent method Claim 22 is thus patentable and it is submitted that its dependent claims, which recite yet further distinguishing features, are also patentable over the cited references for at least the reasons set forth above. Accordingly, these dependent claims require no further discussion herein.

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CONCLUSIONS

In view of the substantive arguments presented above, it is submitted that all of the claims, namely Claims 1-11 and 13-33, are patentable over the prior art. Accordingly, Appellants respectfully request that all of the rejections be reversed.

Respectfully submitted,

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CERTIFICATE OF FACSIMILE TRANSMISSION

I HEREBY CERTIFY that the foregoing correspondence has been forwarded via facsimile number 703-872-9306 to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 this 12th day of October, 2004.

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APPENDIX INCLUDING THE CLAIMS ON APPEAL FOR U.S. PATENT APPLICATION SERIAL NO. 09/931,587

1. (Original) A method for making an integrated circuit (IC) package with an exposed portion of the IC, the method comprising:

providing a mold including first and second mold portions, the first mold portion carrying a mold protrusion defining an IC-contact surface with peripheral edges and a bleed-through retention channel positioned inwardly from the peripheral edges;

closing the first and second mold portions around the IC and injecting encapsulating material into the mold to form the IC package with the exposed portion adjacent the mold protrusion and while the bleed-through retention channel retains encapsulating material bleeding beneath the peripheral edges of the IC contact surface; and

releasing the IC package from the mold.

2. (Original) A method according to Claim 1 wherein said bleed-through retention channel extends adjacent at least a portion of an entire extent of the peripheral edges of the IC-contact surface.

3. (Original) A method according to Claim 1 wherein said bleed-through retention channel extends adjacent an entire extent of the peripheral edges of the IC-contact surface.

4. (Original) A method according to Claim 1

wherein the mold protrusion has a generally rectangular shape.

5. (Original) A method according to Claim 1 further comprising controlling pressure applied by the IC-contact surface to the IC when the first and second mold portions are closed around the IC.

6. (Original) A method according to Claim 5 wherein controlling pressure comprise providing the mold protrusion comprising a resilient material.

7. (Original) A method according to Claim 5 wherein controlling pressure comprises mounting the IC on a leadframe having resilient portions to resiliently accommodate downsetting of the IC as the IC-contact surface contacts the IC.

8. (Original) A method according to Claim 7 wherein the resilient portions comprise die pad support bars extending between a die pad and adjacent finger portions.

9. (Original) A method according to Claim 8 wherein downsetting displaces the die pad below the finger portions.

10. (Original) A method according to Claim 8 further comprising shaping bond wires between the IC and the finger portions so that upon downsetting the bond wires have a desired clearance from the IC and an upper surface of the

encapsulating material.

11. (Original) A method according to Claim 1 further comprising mounting the IC on a substrate prior to closing the first and second mold portions.

12. (Withdrawn) A method according to Claim 11 wherein mounting the IC comprises mounting the IC so that the substrate covers a back surface of the IC opposite the exposed portion to prevent the encapsulating material from extending onto the back face.

13. (Original) A method according to Claim 1 wherein the encapsulating material and the IC have different coefficients of thermal expansion (CTEs); wherein the encapsulating material is injected at an elevated temperature; and further comprising relieving stress caused by the different CTEs as the IC and encapsulating material cool.

14. (Original) A method according to Claim 13 wherein relieving stress comprises using a low stress encapsulating material.

15. (Original) A method according to Claim 13 wherein relieving stress comprises providing a leadframe having a die pad with an opening therein, and mounting the IC on the die pad prior with the opening therein prior to closing the first and second mold portions around the IC.

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16. (Original) A method according to Claim 15 wherein relieving stress further comprises mounting the IC on the die pad with the opening therein by adhesively securing the IC on the die pad using a low stress, low modulus adhesive.

17. (Original) A method according to Claim 1 wherein the exposed portion of the IC comprises upper surface portions with active devices formed therein.

18. (Original) A method according to Claim 17 wherein the active devices define a sensor.

19. (Original) A method according to Claim 17 wherein the active devices define an electric field fingerprint sensor.

20. (Original) A method according to Claim 1 wherein the first and second mold portions each comprises rigid material.

21. (Original) A method according to Claim 1 further comprising periodically cleaning the mold and the mold protrusion.

22. (Previously presented) A method for making an integrated circuit (IC) package with an exposed portion of the IC, the method comprising:

providing a mold including first and second mold

portions, the first mold portion carrying a mold protrusion defining an IC-contact surface;

mounting the IC on a leadframe having resilient portions to resiliently accommodate downsetting of the IC within the mold as the IC-contact surface contacts the IC;

closing the first and second mold portions around the IC and leadframe to downset the IC under controlled pressure applied by the IC-contact surface to the IC and while the second mold portion has a surface opposite the IC that remains spaced therefrom;

injecting encapsulating material into the mold to make the IC package with the exposed portion adjacent the mold protrusion; and

releasing the IC package from the mold.

23. (Canceled)

24. (Previously presented) A method according to Claim 22 wherein the resilient portions comprise die pad support bars extending between a die pad and adjacent finger portions.

25. (Original) A method according to Claim 24 wherein downsetting displaces the die pad below the finger portions.

26. (Original) A method according to Claim 24 further comprising shaping bond wires between the IC and the outer finger portion so that upon downsetting the bond wires

have a desired clearance from the IC and an upper surface of the encapsulating material.

27. (Original) A method according to Claim 22 wherein the encapsulating material and the IC have different coefficients of thermal expansion (CTEs); wherein the encapsulating material is injected at an elevated temperature; and further comprising relieving stress caused by the different CTEs as the IC and encapsulating material cool.

28. (Original) A method according to Claim 27 wherein relieving stress comprises using a low stress encapsulating material.

29. (Previously presented) A method according to Claim 27 wherein relieving stress comprises providing a leadframe having a die pad with an opening therein, and mounting the IC on the die pad with the opening therein prior to closing the first and second mold portions around the IC.

30. (Original) A method according to Claim 29 wherein relieving stress further comprises mounting the IC on the die pad with the opening therein by adhesively securing the IC on the die pad using a low stress, low modulus adhesive.

31. (Original) A method according to Claim 22 wherein the exposed portion of the IC comprises upper surface portions with active devices formed therein.

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32. (Original) A method according to Claim 31 wherein the active devices define a sensor.

33. (Original) A method according to Claim 22 wherein the mold protrusion comprises a resilient material.

34-61 Canceled.

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EVIDENCE APPENDIX

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RELATED PROCEEDINGS APPENDIX

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